

SWBAT

split vectors into
components and
combine vectors
graphically and
numerically

Sep 4-7:31 AM

Welcome!!!

SECA CP Physics
Tuesday 22 December 2015



H. Leslie Grebe
Room C-244

Centering
(quotes)

- Show me you are passing on SchoolView, or secure phone!
- Pg 49 - FP Intro to vector components
- Adding "My Vectors"

Opening Activity - Quick Write!

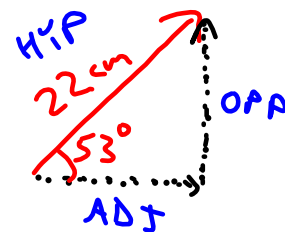
What does SOH-CAH-TOA mean?

$$\sin \theta = \frac{\text{OPP}}{\text{HYP}}$$

$$\cos \theta = \frac{\text{ADJ}}{\text{HYP}}$$

$$\tan \theta = \frac{\text{OPP}}{\text{ADJ}}$$

How does it apply to this picture?



$$\sin 53^\circ = \frac{\text{OPP}}{22\text{cm}}$$

$$\text{OPP} = 22\text{cm} \cdot \sin 53^\circ$$

Sep 7-7:04 AM

What we should have solid:

Memorize our 5 vocab cards, units, vector or not, definition, formula

Be able to answer distance vs displacement questions

Be able to make measurements of real-life motion. Know what is likely to make timing things difficult and how to get more reliable timing results

Be able to convert between miles and meters, between hours, minutes, and seconds

Be able to calculate speed = dist/time and velocity = disp/time

Know what all of the symbols in the UAM equations stand for and mean

Be able to turn a UAM word problem into a list of knowns and unknowns

Be able to pick the equation with those 4 things in it

Be able to put the knowns into that equation

(Be able to solve for the unknown)

→ PROJECTILES: V_x IS CONSTANT; $a_y = -9.8 \text{ m/s}^2$ ^{V_y CHANGES} PG 42
 PG 43 TIME, Δt , CONNECTS x & y
 PG 49 VECTORS INTO x & y , ADD VECTORS
 SOH - CAH - TOA

QW every day to review? Volunteer answers on board?

Dec 4-9:15 AM

Unit	Chapters	Date
Left-Side Items	Page	Right-Side Items
REFLECTION ON NOTES	2	Ed Ed Adam Savage
HOW FAR FROM BRIDGE	4	"FORT STUEBEN"
REFLECTION ON NOTES	6	Hmwk: BASIC UNITS
PR: DISTANCE & DISPLACEMENT	8	Hmwk: FP DISPLACEMENT
DIAGRAM & STEPS	10	TIMING & ERROR
SUMMARY OF TIMING	12	How to BUILD a TABLE
PR: CONVERTING SOLNS	14	Hmwk: FP CONVERSIONS
PR: VELOCITY & SPEED	16	Hmwk: FP SPEED & VELOCITY
SPEED WORD PROBLEMS	18	ALGEBRA FOR PHYSICS
LAB JOURNAL 10/7	20	LAB JOURNAL 10/8
LAB JOURNAL 10/12	24	Hmwk: FP GRAPHS POSITION
26	USE FOR PROJECT	27
OBSERVATIONS OF ORF	28	FP: INTRO TO ACC.
REVIEW FOR TEST	30	BALL ON RAMP
VECTORS, DIRECTION	32	FP: BASIC ACC EXAMPLE
PRACTICE UAM	34	FP: INTRO TO UAM
FALLING OBJECTS PACKET	36	FP: INTRO TO FREEFALL
MY FREE FALL WORD PROBLEM	38	3-ACT FALLING GLOWSTICK
Toy popper experiment	40	Free fall class solutions
Launched vs. Dropped	42	FP: INTRO TO PROJECTILE MOTION
PROJECTILE SIMULATOR	44	FP: PROJ. MOTION PROBLEM
PROJ'L PRACTICE PROB	46	PROJECTILES PRACTICE
OUR VECTOR PRACTICE	48	FP - VECTOR COMPONENTS
VECTOR PACKET	50	NOTES ON ADDING VECTORS




Sep 5-9:09 AM

pg 48

Adding Vectors:

What do you think???

DISPLACEMENTS

- 4 m north + 3 m north = ? 
- 4 m north + 3 m south = ? 
- 4 m north + 3 m east = ? 

$$d = \sqrt{3_m^2 + 4_m^2}$$

$$a^2 + b^2 = c^2$$

$$= \sqrt{9m^2 + 16m^2} = \sqrt{25m^2} = 5m$$

Hmwk: FP - Intro to vector components pg 49

FP - A problem to review SOH-CAH-TOA

$$a^2 + b^2 = c^2$$

$$d = \sqrt{(40\text{ cm})^2 + (9\text{ cm})^2}$$

• X COMPONENT = +40 cm

y COMPONENT = +9 cm

$$\sin \theta = \frac{\text{OPP}}{\text{HYP}}$$

$$\cos \theta = \frac{\text{ADJ}}{\text{HYP}}$$

$$\tan \theta = \frac{\text{OPP}}{\text{ADJ}}$$

$= 41 \text{ cm}$
HYPOTENUSE

40 cm

ADJACENT

$$\tan \theta = \frac{O}{A} = \frac{9\text{cm}}{40\text{cm}}$$

$$\theta = \tan^{-1}\left(\frac{9\text{cm}}{40\text{cm}}\right) = 12.68^\circ$$

Dec 16-8:38 AM

Classwork due TODAY:

- Break "my vector" into components
- Add to someone else's vector
- Find "resultant" = total new vector (hyp & angle)

Hmwk / Classwork DUE TUES 1/5

<http://www.physicsclassroom.com/Physics-Interactives/Vectors-and-Projectiles>

Use websites to reinforce learning

Vector PACKET

Dec 17-8:10 AM

NOTES ON ADDING VECTORS PG 51

3 DIFFERENT WAYS TO ADD VECTORS

#1) SOH-CAH-TOA (PG 48 PRACTICE)

SPLIT EACH INTO X & Y
 ADD x_s , ADD y_s
 $\tan \theta = \frac{y}{x}$
 $\theta = \tan^{-1} \left(\frac{y_1 + y_2}{x_1 + x_2} \right)$
 $d = \sqrt{(x_1 + x_2)^2 + (y_1 + y_2)^2}$
 RESULTANT


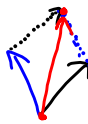
#2) "TIP TO TAIL"

TAIL \rightarrow TIP

- LINE UP 2 VECTORS
NO TWISTING
- DRAW IN RESULTANT FROM START OF 1ST TO END OF 2ND

#3) PARALLELOGRAM METHOD

- NO TWISTING
- "SLIDE" EACH UP ALONG THE OTHER TO MAKE A PARALLELOGRAM
- RESULTANT IS FROM WHERE BOTH START TO WHERE BOTH END.

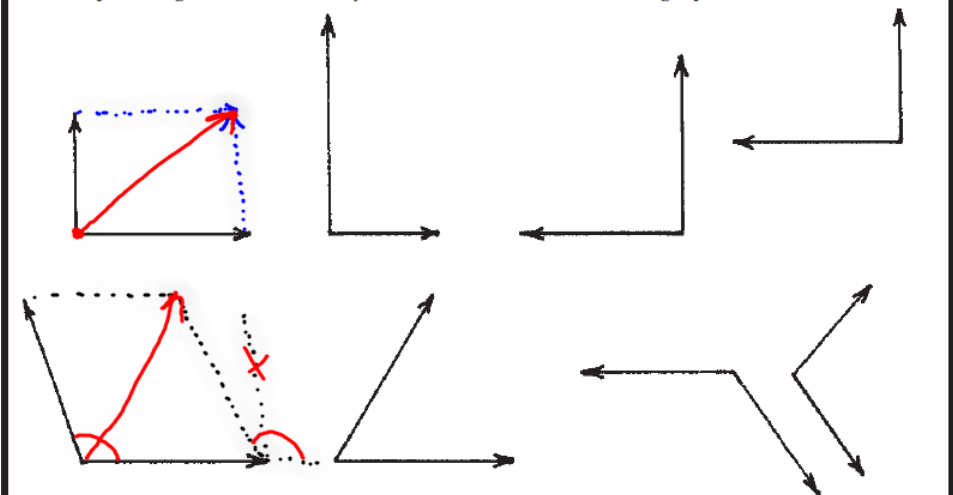
Dec 22-9:49 AM

Name _____ Class _____ Date _____

Concept-Development Practice Page 5-2

Vectors

Use the parallelogram rule to carefully construct the resultants for the eight pairs of vectors.



Dec 22-10:05 AM

cpd0502.pdf - Adobe Reader

File Edit View Window Help

Open 1 / 2 107% Tools Fill & Sign Comment

Carefully construct the vertical and horizontal components of the eight vectors.

© Pearson Education, Inc., or its affiliate(s). All rights reserved.

y *x*

I was only a scalar until you came along and gave me direction, \vec{v} sighs

CONCEPTUAL PHYSICS

Dec 22-10:10 AM

File Edit View Window Help

Open 2 / 2 107% Tools Fill & Sign Comment

View or add comments

20 m/s

$g = -10 \text{ m/s}^2$ EACH SEC

5 m/s

30 m/s

Use the geometry theorem $c^2 = a^2 + b^2$ to find the resultant velocities.

More specifically, $v = \sqrt{v_x^2 + v_y^2}$

, or its affiliate(s). All rights reserved.

Dec 22-10:12 AM